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I, SMILJA DRAGOSAVLJEVIC, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002952478 for a patent by GEO-PROCESSORS PTY LIMITED as filed on 05 November 2002.

WITNESS my hand this
Fourth day of September 2003

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PRECIPITATED CALCIUM CARBONATE PRODUCTS FROM BICARBONATE-BEARING WATER RESOURCES

The present invention relates to a novel method for production of Precipitated Calcium Carbonate (PCC) products from water resources with elevated Bicarbonate ion concentration, which products are useful, for example, as effective fillers in manufacture of newsprint and other printing papers, plastics, paints and rubber products, as well as adhesives and sealants. The invention also offers the added advantage of generating a decarbonated water, after the separation of the said products in slurry form, which water may be reused after desalting using conventional desalination processes or diluted and safely disposed of. Thus, one aspect of this invention relates to disclosure of an alternative method for recovery of dissolved Bicarbonate ion as high-grade PCC products, and another aspect of the invention relates to generation of a reusable or disposable water in a cost-competitive and environmentally acceptable way.

Fresh to mildly saline waters of both surface or groundwater origin, and particularly those contained in or emanating from certain sedimentary and volcanic rock formations are known to contain elevated concentration of Bicarbonate (HCO3) ion in dissolved form, with HCO3 ion concentrations varying between few hundreds and several thousand gram per liter reported in the literature. Currently, the bulk of such Bicarbonate-rich water resources in Australia and many parts of the world are not commercially used because of absence of any proven and cost-effective technology to enable treatment and utilisation of the treated water for the dual purpose of value generation and environmental beneficiation.

It is consequently an object of the present invention to disclose alternative methods for the cost effective manufacture of quality PCC products from Bicarbonate-bearing groundwaters with the added benefit of generating a spent water for safe disposal and/or reuse..

Primary feed solutions most suitable for the manufacture of PCC products are those waters with relatively low Chloride (Cl) ion content but elevated Bicarbonate (HCO3) ion concentration, with the concentration of the latter ion preferably being 1g/L or higher values.

According to the present invention there is disclosed a common process for the manufacture of PCC compounds from the above-described groundwater types, comprising the process steps shown in Figure 1 and described below:

(a) if required, pre-concentration of the raw groundwater solution by natural evaporation or artificial means, to adjust Bicarbonate (HCO3) ion concentration in the solution to between 1g/L and 15g/L HCO3;

(b) reaction of the raw groundwater or pretreated feed solution with hydrated lime slurry or Calcium Chloride (CaCl2) solution, under constant stirring conditions at temperatures 30 degrees Centigrade or higher, to allow formation of a slurry due to nucleation of fine grain Calcium Carbonate crystals;

(c) transfer of the slurry to a solids/liquid separation vessel to allow proportional removal of the decarbonated supernatant (Spent Water) to a neutralisation vessel, followed by pH adjustment to around pH 7 by adding acid, and re-use or disposal of the resultant neutralised water;

(d) transfer of the slurry to a wash thickener vessel, washing the slurry first with fresh water to remove excess dissolved salts, followed by thickening to obtain a Precipitated Calcium Carbonate Slurry Product;

(e) Optionally and depending on market requirements, as indicated in Figure 1, further dewatering of the Precipitated Calcium Carbonate Slurry Product (in "d") to obtain a cake, which is dried and powdered to obtain a Precipitated Calcium Carbonate Powder Product.

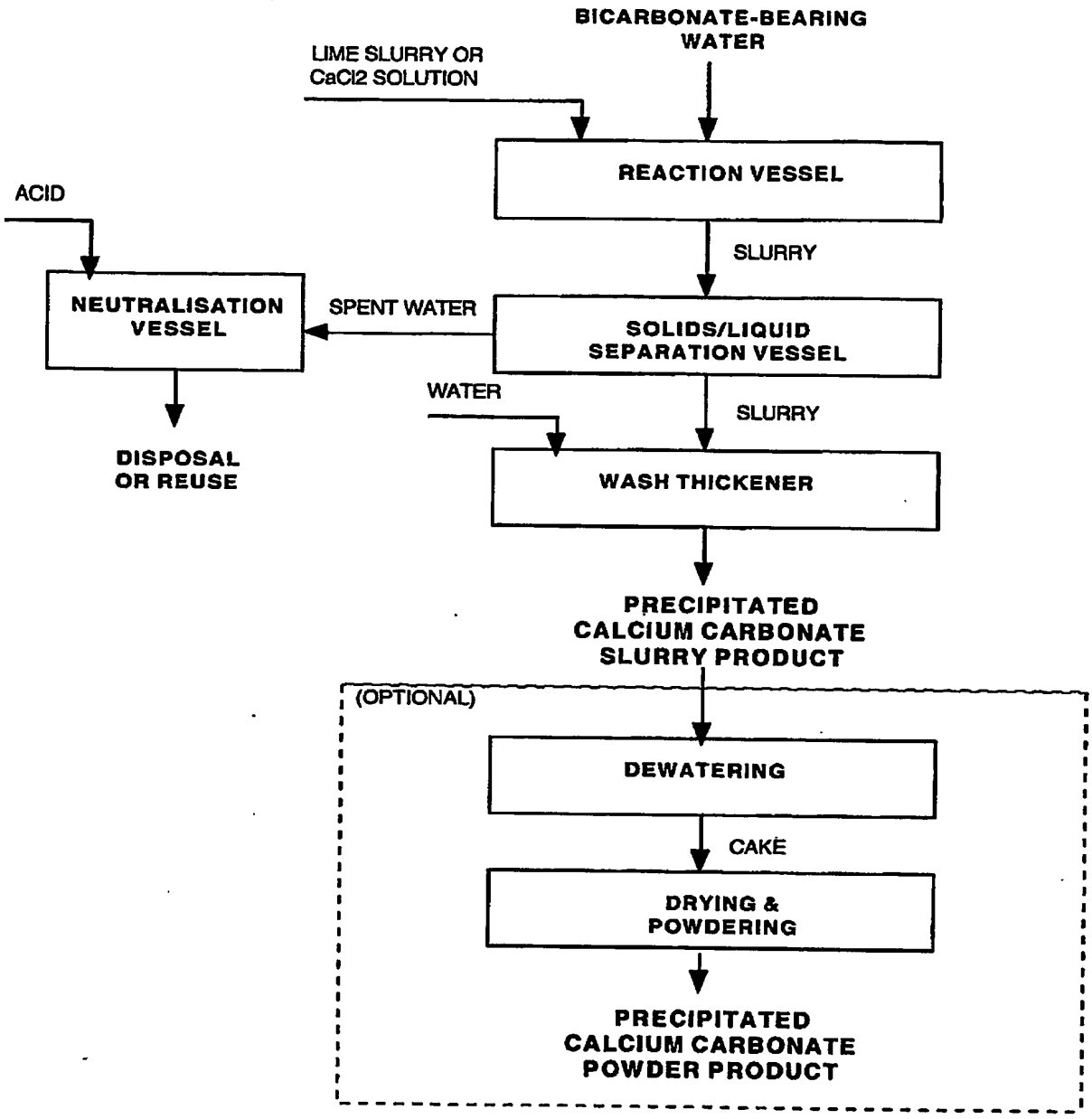
The resultant PCC products, in final slurry forms or optionally in dry powder forms, are comprised of micro-crystalline Calcium Carbonate minerals and mineral particles, having particle morphologies suitable for various industrial applications.

In summary, this innovation offers a simple way for the manufacture of Precipitated Calcium Carbonate (PCC) products, in either slurry or powder forms, with both achieving product specifications suitable for application as a pigment, for example, in paper coating or for production of plastics, paint and rubber, adhesives and sealants.

Geo-Processors Pty Limited

Dated this 5th day of November 2002.

FIGURE 1



(To accompany Provisional Application by Geo-Processors Pty Ltd, entitled: "Precipitated Calcium Carbonate Products from Bicarbonate-bearing Water Resources")